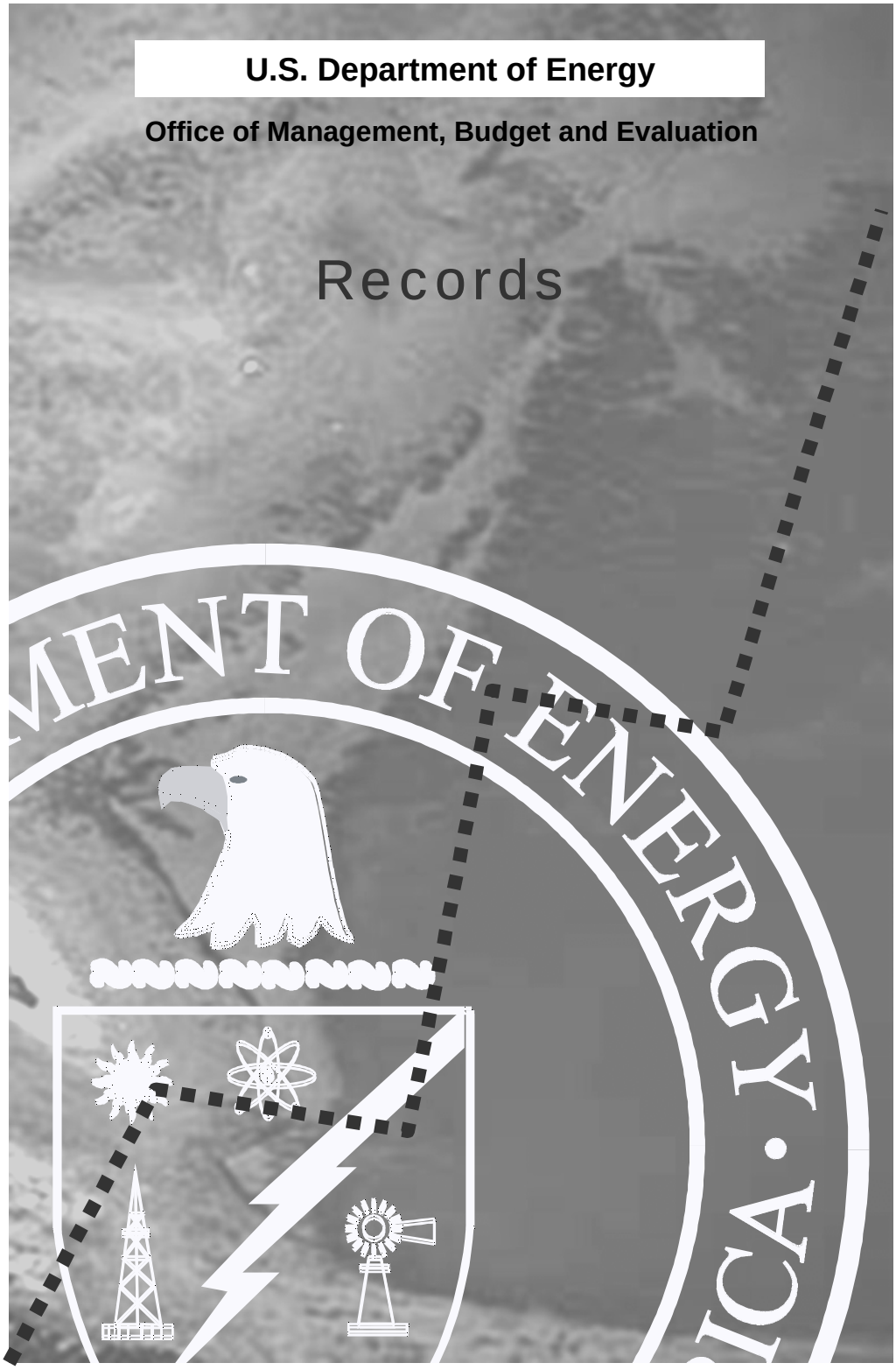
U.S. Department of Energy

Office of Management, Budget and Evaluation

Records



Initiated by: Office of Engineering and Construction Management

RECORDS

Completing a project successfully requires that all project participants be continuously provided with timely, thorough, and accurate project information, including participants, activities, decisions, progress against baselines, changes, decisions, and end product(s). As a project proceeds through its life cycle, the number of participants and activities grow significantly and the volume of information grows exponentially. The task of satisfactorily managing this information is a major challenge, but is essential to ultimate project success. This section identifies methods of managing and controlling project records and information.

In the early stages of a project's life cycle, functions and requirements contained in mission need and conceptual design documentation define the project's end product(s). At this time the number of project participants is small and the task of managing project information is relatively simple. The primary focus in these early stages is on controlling changes to the functions and requirements, thoroughly evaluating and documenting all changes, and ensuring the rapid dissemination of approved changes to all project participants. This process is usually accomplished by controlling the revision and distribution of the project documents by their unique identification numbers.

In the last stages of a project's life cycle, all of the previous records management efforts come to fruition as the inventory of project records is prepared for disposition: disposal, storage, or transfer to the user organization. Without exception, the ability of a project to successfully complete its records management responsibilities is entirely dependent upon the records management planning, organizing, managing, and controlling exercised during all previous stages of the project.

1.0 BACKGROUND AND INFORMATION

As a project progresses through its life cycle, functions and requirements are expanded to develop design requirements for the functional and physical configuration of the project's end product(s). These design requirements, in turn, are expanded to the detail required to design, procure, construct, check out, accept, and turnover/deliver the end product(s). During this same period of time, the number of participants also expands to include designers, vendors, suppliers, constructors, operators, and stakeholders—all often representing different organizations and interests. As a result, the task of managing information becomes very complex. The increased volume of information, number of documents, number of participants, and number of requests for changes all contribute to project complexity.

The key processes for managing project information include preparation, receipt, identification, review and approval, acceptance, document control, change control, and data management, defined as follows:

- *Preparation*. The generation of original documents, including drawings, specifications, studies, tests, vendor data, and inspections.
- *Identification*. Selection of the components of the end product(s) that are to be controlled and the selection of those documents that adequately define both the end-products and the selected components.
- *Receipt*. The acceptance by the project of unapproved project documents, and the identification, reproduction, distribution, and storage of those documents.
- *Document Control*. Receives, identifies, stores, controls, reproduces, tracks, retrieves, and distributes documents. Assures only the latest versions of approved project documents are in the posession of project participants.
- *Change Control*. Provides a systematic process for managing changes to a project and its physical and functional configuration to ensure all changes are properly identified, evaluated, reviewed, approved, implemented, tested, and documented.
- *Data Management*. Ensures that necessary project information and project end product(s) data are systematically recorded and disseminated for decision making and other uses. Data management is synonymous with "configuration status accounting" as used in contemporary configuration management literature.
- *Reviews and Approvals.* The evaluation of project documentation, providing comments to the document originator, resolving review comments and revising document submittals until they accurately reflect project requirements.
- *Acceptance*. The process of accepting project documents as demonstrated by revision numbers, approval signatures, stamps, and dates.

Collectively, the integration of the above elements among all project participants is referred to as configuration management. Figure 1, Documentation and Data Management in the Project Life Cycle, illustrates the relationship of these elements to the project life cycle and critical decisions.

As illustrated in Figure 1, elements of documentation and data management are applicable through all phases of the project life cycle. This requires that Headquarters, field managers, the PD, and the PM (using a tailored approach) implement applicable elements of documentation and data management in all project-related activities. These applicable configuration management elements interface with and are further integrated with the activities of contractors and other project participants. Collectively, these activities represent configuration management efforts applicable throughout the project life cycle.

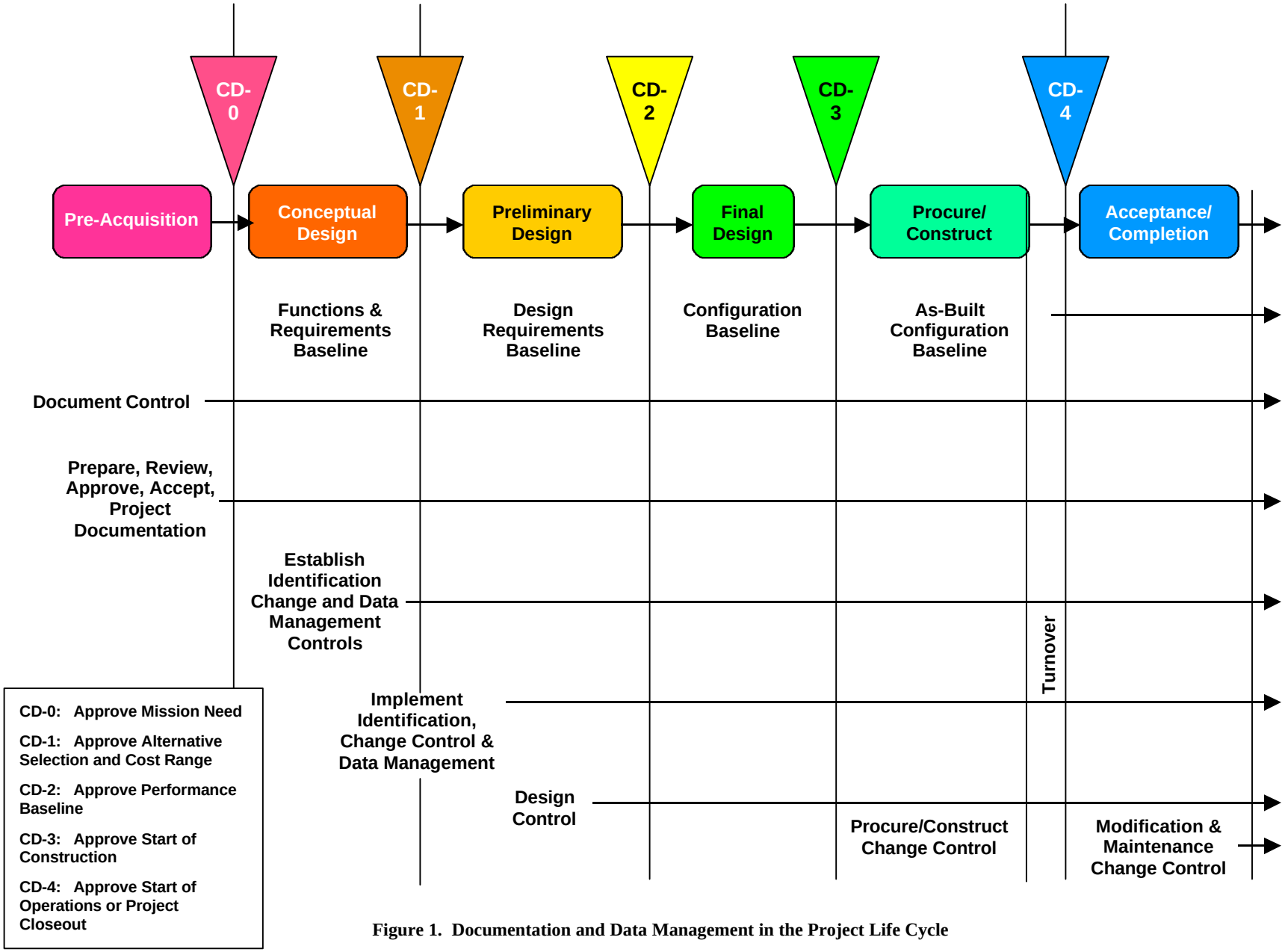


Figure 1. Documentation and Data Management in the Project Life Cycle

2.0 CONFIGURATION MANAGEMENT, RECORDS, AND BASELINE MANAGEMENT

At any point in its life cycle, from pre-acquisition to completion of the Transition/Closeout phase, a project has a configuration. Initially, its configuration is a conceptual arrangement of the parts or elements of the desired end product(s). This is typically documented in high-level functions and requirements, Project Execution Plan (PEP), Conceptual Design Report and study and test reports. As the project proceeds through its life cycle, the configuration is defined in greater detail through the design process and documented in specifications and drawings. At the end of the life cycle, the configuration becomes an actual physical and functional configuration of the end product(s) and is associated as-built documentation.

Configuration management is used to identify and document the configuration of the end product(s) and throughout the project's life cycle control changes to that configuration.

At selected points in a project's life cycle, the current configuration at that point is established as a reference point or technical baseline. The technical baseline is combined with other project activities (e.g., activities to construct or activities to conduct remedial action) to form a scope baseline. The scope baseline is then used as a basis for developing project schedule and cost baselines. The scope, schedule, and cost baselines serve as a basis for project authorization and management, and as a standard for measurement during project execution. As such, the scope, schedule, and cost baselines are the established plan against which the status of resources and the progress of a project are measured.

Baseline management is used to measure progress and control changes to the scope, schedule, and cost baselines. Configuration management and baseline management are integrated, in that the baselines are derived from the configuration and share a common change control process.

3.0 PROCESS OVERVIEW

Figure 2, Configuration Management Process Flow Diagram, depicts the overall configuration management process and process elements. In addition to the key elements of Preparation, Identification, Document Control, Change Control and Data Management, Figure 2 includes the Change Implementation and the Review Approval, and Acceptance process elements. Specific applicability of these processes to DOE projects is addressed in the Practice on Performance Baseline Development and Validation, and the Practice on Critical Design Packages, respectively. A general description of these process elements is provided in the following paragraphs:

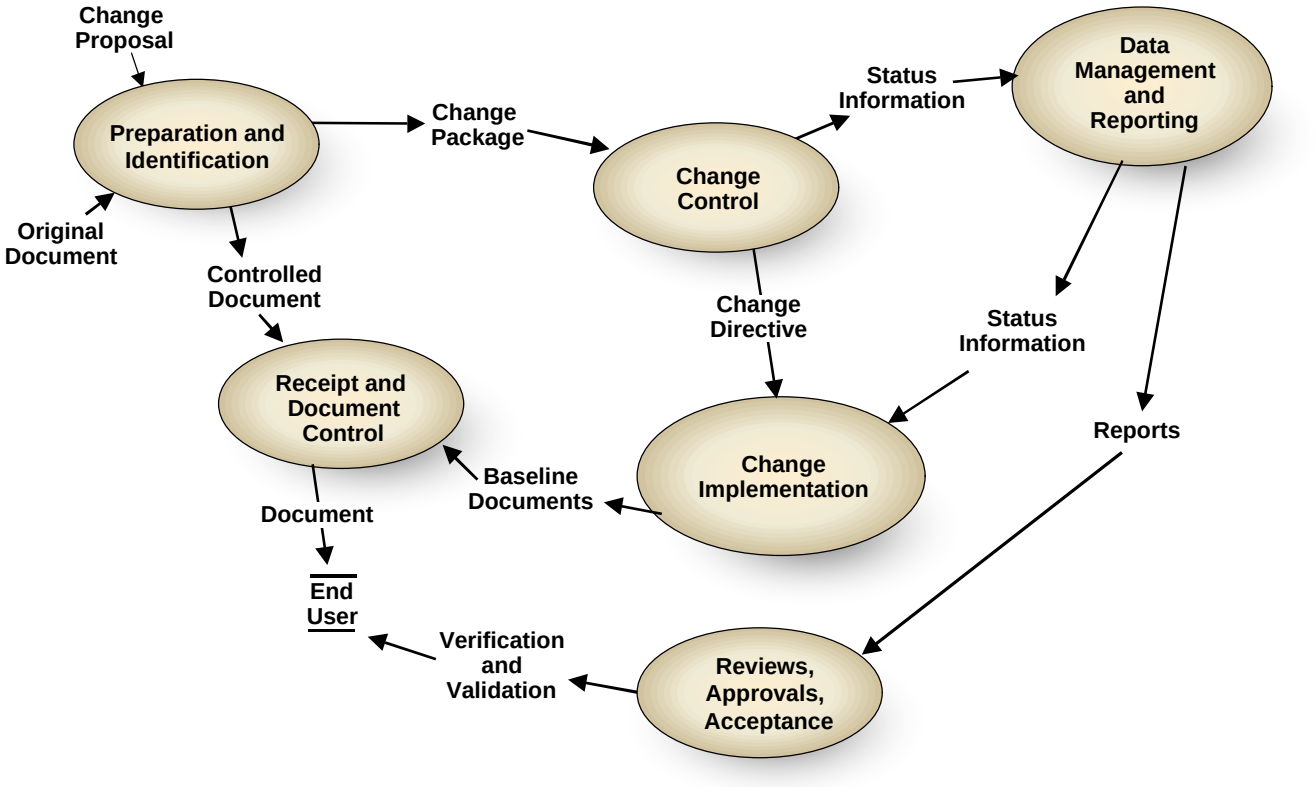


Figure 2. Configuration Management Process Flow Diagram

3.1 Identification

The processes and methods of preparing and identifying components of the end product(s) (also referred to as configuration items), as well as the supporting documentation that defines the project and its components are subject to control. The supporting documentation includes the numbers and other identifiers (e.g., document numbers, drawing numbers, equipment numbers) assigned to configuration items and documents, and the approved technical documents that identify and define configuration items' functional and physical characteristics, such as specifications, drawings, associated lists, and interface control documents.

3.2 Document Control

Document control provides for receiving project documents, controlling the distribution of documents and approved changes, and retaining the master copies in storage for control and safekeeping. Document control also maintains distribution lists and a master controlled document index. The distribution lists maintain continuous, current records of documents received, identifies individuals who receive copies, the purpose of the distribution (information review and comment, approval), and the disposition of the document. The index includes information such as document title, document number, revision number or date of issue. Controlled distribution ensures that recipients of controlled documents are

notified of approved changes and that superseded documents are not used for performing work. Document control also provides for record receipt, organization, reproduction, and eventual disposition.

3.3 Change Control

The process of managing proposed changes to configuration controlled items and technical documentation ensures proposed changes are accurately described, systematically reviewed and evaluated for impact, implemented upon approval, and closed out. The change control process provides for technical scope, schedule, and cost reviews of proposed changes (see the Practice on Performance Baseline Development and Validation).

3.4 Data Management and Reporting

Data management and reporting is the process of recording and reporting the current status of configuration controlled items technical documentation, and all proposed and approved changes throughout the life cycle of the item. Data management and reporting satisfies two needs. The first is to track the implementation of approved change proposals to ensure that all affected documents are updated and that all change directive instructions are followed. This also permits the generation of reports providing the current approved configuration of controlled items, associated documentation and pending changes. The second need is to create and maintain an audit trail of change proposals through the configuration change control process so that chronological records of changes and reports of those changes can be prepared for any configuration controlled item or baseline document.

3.5 Reviews

Reviews are the process of verifying:

- The technical baseline satisfies design requirements
- The physical and functional characteristics of configured items conform to the technical baseline
- Approved changes have been properly incorporated into the technical baseline
- As-built configurations conform to the approved technical baseline
- The entire configuration management program performs in accordance with approved plans and procedures.

Reviews are performed periodically to validate that project documentation is properly updated and to verify that only current controlled documents are being used to perform work. Integral with reviews are document approvals and acceptance, because documents may not be used to perform work unless and until they are approved and accepted. Approval is demonstrated through signature of authorized individuals, dates, and/or approval stamps.

Stamps can vary from Information Only to Approved for Construction, to a professional engineer's validation.

4.0 PLANS AND PROCEDURES

The documentation and data management processes are controlled using a project configuration management plan. Preparation and use of a configuration management plan should be based on a tailored approach. Each non-DOE organization (e.g., construction) participating in a project should be required to prepare and maintain a configuration management plan for their portion of the work. Each plan should integrate with the project-level plan as well as the plans of all other project participants. If appropriate the project-level configuration management plan could be an integrated, cohesive assembly of the plans of other project participants. The plan should include a discussion of how configuration management will be achieved on the project and should identify which items will be so managed. Wherever practical, configuration management activities should be included as steps in procedures for related activities, rather than in sole configuration management procedures, since the steps are integral to the process.

5.0 SCOPE (TECHNICAL) BASELINE IDENTIFICATION

The project technical baseline is combined with other project activities to form the scope baseline. The scope baseline is the basis for schedule and cost baselines. The technical baseline defines the physical and functional configuration of the project's end product(s). Baseline management controls the scope, schedule, and cost baselines, and integrates with configuration management that controls the technical baseline. Data management controls information on the project and the configuration of its end product(s).

The technical baseline consists of a top-down set of requirements in which all subsidiary requirements flow down from the requirements above them. Typical DOE technical baselines are defined below.

The baseline titles may vary for a particular project and there may be fewer or more baselines. For example, the Tank Waste Remediation System, an EM Strategic System, has two program technical baselines (functional requirements and technical requirements) and five program element/project baselines: design requirements, design configuration, as-built configuration, operational, and decontamination. A minimum set of technical baselines would be those required to support scope, schedule, and cost baseline critical decision submittals.

The relationship of these baselines to the Project Life Cycle is shown in Figure 1. A recommended set of documents that should be included in each baseline is also shown in Table 1, Typical Scope (Technical) Baseline Documents.

Table 1. Typical Scope (Technical) Baseline Documents

FUNCTIONS AND REQUIREMENTS BASELINE

- Codes, Standards, Regulations, and Orders
- Strategic Plans
- Acquisition Execution Plan
- Project Plans
- Mission Need Statement
- Conceptual Design Report
- Studies
- PEPS
- Development Report
- Interface Control Documents
- Acquisition Strategy
- Risk Assessment

DESIGN REQUIREMENTS BASELINE

- Design Criteria
- Preliminary Safety Analysis Reports
- Requirements Document
- Conceptual Design
- Laboratory/Pilot Plant Test Reports
- Preliminary Design
- Value Management Studies
- Interface Control Documents
- Work Breakdown Structure
- Alternative Solution

CONFIGURATION BASELINE

- PEP
- Final Safety Analysis Report
- Final Design
- Operational Safety Requirements
- Specifications
- Drawings
- Quality Assurance Procedures
- Test Procedures
- Operating and Maintenance Manuals and Procedures
- Procurement Documents
- Work Control Packages
- Construction Documents

5.1 Functions and Requirements Baseline

The initial baseline for projects is developed during conceptual design and supports Critical Decision-1. It establishes the functions and technical requirements of DOE projects. At this stage of a project, the configuration represented by the baseline is conceptual with nothing yet designed or built. The functions and requirements baseline is generally developed as follows:

- The DOE mission and objectives are defined.
- Functions of the DOE project are defined.

5.2 Design Requirements Baseline

For complex projects, the design portion of the Execution phase is often divided into preliminary design and final design. Through the preparation of preliminary planning and engineering studies, preliminary design translates the functions and requirements from the Definition phase into preliminary drawings and outline specifications, life cycle cost analysis, preliminary cost estimates and preliminary schedules for project completion. Preliminary design identifies long-lead procurement items and provides an analysis of risks associated with continued project development. At this stage of a project, the configuration defined by the preliminary drawings and outline specifications is represented by the design requirements baseline with the following content:

- The physical systems for each project or facility are identified.
- The boundaries and interfaces for each physical system are identified.

- The major components for the physical systems are identified and defined.
- The functions and requirements, performance criteria and constraints established in the Definition phase are allocated to the respective physical systems and major components.

5.3 Technical (Scope) Baseline

The configuration baseline represents the output of the detailed design portion of the Execution phase and supports the Critical Decision-3. The functions and requirements from the Definition phase and the design requirements from preliminary design, as applicable, are expanded to include the detail required to procure and construct the systems and components of the end product(s). The configuration of the project is defined by the design output documents that include procurement and construction specifications, drawings, test procedures, and operating and maintenance information.

5.4 As-Built Configuration Baseline

At the completion of the construction portion of the Execution phase, the detailed design documents established in the configuration baseline are used to establish the as-built configuration baseline as follows:

- All changes to the configuration baseline that occur during construction are approved and reflected in the as-built configuration baseline.
- All changes to the configuration baseline during the operations phase after system turnover are approved and reflected in the as-built configuration baseline.
- Configuration baseline documents (with approved updates) are incorporated to reflect the physical configuration.
- Interfaces among the DOE activities and projects with other facilities and projects are identified and incorporated into the as-built configuration.

5.5 Establishment of Baselines

Development of baselines for DOE projects and operating facilities should adhere to the following management concepts set forth by DOE O 413.3 and DOE M413.3-1:

- Identification, documentation, and approval of basic requirements
- Specification of a systematic process for developing baselines
- Formal identification and approval of baselines
- Identification, documentation, and approval of allowances from the approved baselines.
- Controlling changes to approved baselines
- Regular reporting and assessment of project status against the approved baselines

- Corrective action (that may include baseline revision) in the event a prescribed threshold is breached.

5.6 Records Identification

Each project record shall be identified with a unique identifier (e.g., drawing, component, or equipment number). The unique identifier is necessary to ensure consistency, retrievability, and traceability of technical and baseline documentation for configured items. In addition, each project should develop and maintain current lists of project products (e.g., drawings, specifications, equipment, instrumentation, lines, valves, etc.) Documentation associated with each physical product (pumps, valves) should be traceable to that item through the unique item identification number. For DOE, the configuration identification guidelines apply specifically to

- Physical items (e.g., facilities, structures, systems, and components)
- Software
- Site charactization data and samples
- Studies, demonstrations and text, including data and analyses
- Waste packaging
- Documentation (including supporting analysis and data).

The level of identification required varies with the importance of the configuration item and the indentured level from which documentation needs to be retrieved. Structures, systems, and components important to safety require a more detailed identification than non-safety related items. This ensures traceability of requirements throughout the life of the project or operating facility.

5.7 Traceability

Configuration management requires traceability of technical baseline requirements and data through all phases of a project. Technical baseline documents should establish traceability of requirements through all levels of documentation and to the configured items. Regulatory and other design basis requirements depicted in documents that describe configured items should be readily traceable to their origin through design requirements, documents, etc.

The baselining process allocates technical requirements to subsequent levels of detail. Throughout the design, construction, and turnover phases, materials and components should be traceable to their application and physical location. Traceability of technical requirements should be established by uniquely identifying configured items and incorporating them in the associated documentation. Data management systems should be used to cross-reference the appropriate documents to configuration controlled items.

5.8 Software Records Management

The configuration management program should require that essential computer software and associated documentation be identified and controlled. Software designated to be controlled should be uniquely identified and established as part of the technical baseline. Software that should be included in the configuration management program includes:

- Operations and process control
- Safety and Security systems
- Engineering development, design analyses, evaluation, and assessment
- Mathematical models
- Database or document indexes when used as a controlled source
- Computer-aided design/manufacturing/engineering (CAD/CAM/CAE)

5.9 Interface Control

The functions, requirements, and physical characteristics of the end product(s) at common boundaries among project participants' other projects, and other facilities are identified, documented, and controlled. For complex projects, interface control working groups should be established to identify, document, monitor and control interfaces. Interface control documents are used to define interfaces, interface responsibilities, and interface requirements in terms of functions, requirements, and physical characteristics, as appropriate, and interface constraints and assumptions. For documenting and controlling changes in functions, requirements, and physical characteristics among configuration items controlled by different organizations, the interface control documents should include interface control drawings and should be baselined, approved, and controlled.

5.10 Data Management

Computerized information applications should be used to collect, store, and maintain configuration management technical baseline information and changes thereto. When used, the design, development, implementation, and use of these applications should be subject to the guidelines of the configuration management program.

New facilities should develop a master list, e.g., Master Equipment List, database during design and construction. These lists should contain structures, systems, and components selected by the project manager and the contractor based upon safety grades assigned to these systems. As a minimum, the list should have the following features:

- Each structure, system, and component should be classified (where applicable) by engineering system, start-up system, operating system, safety class, hazard category, instrument loop number, piping line number, circuit number, plant location, applicable

Work Breakdown Structure element, or any other category of interest to users of the Master Equipment List.

- Lists should be extractable by category, e.g., a list of all Safety Class 1 items.
- Each component should reference its unique identification engineering drawing or specification number, as well as other related documents. For example, applicable Safety Analysis Reports, interface control document, spare parts list, and test procedure.
- Operating and maintenance procedures should be cross-referenced to their associated structures, systems, components, and operating systems as applicable.
- Each existing facility classified as a Hazards Category Class 3 or higher should develop a Safety Equipment List for Safety Class 1 equipment. The Safety Equipment List should contain the data specified above and be a subset of the Master Equipment List.

5.11 Reviews/Assessments

Reviews and assessments should be performed regularly by each project to measure the effectiveness of the configuration management process and the consistency between the project physical system and documentation that represents that system. Contractor reviews, assessments, surveillances, results and corrective actions must be documented and tracked to closure.

- Programmatic Assessment. Programmatic assessments should determine the acceptability of the configuration management process and implementation of the requirements contained in project execution and planning documentation. Initially, assessments should identify procedural weaknesses and necessary corrective actions. Subsequent assessments should determine the effectiveness of identified corrective actions as well as continuing to monitor and improve the configuration management process.
- Physical Configuration Assessments. Periodic physical configuration assessments should determine the consistency between the documented technical baseline and the as-built physical configuration. Discrepancies should be identified and analyzed and appropriate corrective action taken to resolve each one. An annual schedule for physical configuration assessments should be prepared by the contractor and submitted as an integral part of work planning documentation.

6.0 DOCUMENT CONTROL FOR CONFIGURATION MANAGEMENT

Documents must be controlled and distributed to ensure that only the applicable approved version is available for use, and to ensure prompt communication of changes. Effective control of documents is essential to the success of the configuration management program because the documents are the vehicles used to communicate information to affected

organizations. The configuration management program should ensure processes (based on a tailored approach) are in place to ensure that:

- Controlled documents are uniquely identified and identification systems are proceduralized.
- Controlled documents are reviewed, approved, released , and changed through the change control processes.
- Controlled documents are mainteined current to the user orgnaizations through controlled distribution, including a document receipt acknowledgment process.
- Users needing copies of controlled documents have ready access to current revisions of controlled copies.
- Databases providing revision-level information are controlled and maintained current.
- Record retrieval systems are in-place to allow timely retrieval of historic documents as well as the material cross-referenced in those documents.
- Effective dates are established for controlled documents to allow for changes to impacted documents and related training.

All technical baseline documents should be issued as controlled documents. Upon approval, these documents should be entered in the appropriate controlled document list.

6.1 Roles

Each project organization has specific roles and responsibilities related to documentation and data management:

- Project Manager
  - — Generate and distribute a controlled document list.
  - — Approve the standard distribution list for the controlled documents within their areas of responsibility.
  - — Ensure only current revisions of controlled documents are used in performing project work.
- Document Originating Organization
  - — Ensure controlled documents being released for distribution have been appropriately reviewed for technical adequacy and approved.
  - — Ensure effective dates for controlled documents are established prior to release for distribution.
- Document Distributing Organization

— Ensure controlled documents are distributed in accordance with approved procedures.

6.2 Guidelines

Organizations that generate project documents should define the process for the preparation, format, review, approval, revision, and verification of the technical adequacy of those documents:

- Document Numbering.
  - — Each controlled document should be identified by a unique number that appears on all pages of the document. The original identification number should be retained throughout all changes to and revisions of the document. Should a document be canceled, that unique number should not be reused.
  - — The current revision number of each controlled document should appear on all changed pages issued since the initial issuance or last complete revision.
  - — Pages within a controlled document should be numbered in a manner that allows page accountability.
- Control Identification. Controlled documents should be cleanly identified as controlled by use of colored paper or a color-identified stamp indicating a “controlled” status. Black is not an acceptable color identification for the control stamp. Without this control identification, documents should be considered uncontrolled.
- Controlled Documents List. A controlled documents list should be prepared and maintained that identifies controlled documents originated by their organizations and lists the individual document title and number, the current revision number and date, effective date, and the originating and distributing organizations.
- Document Revisions
  - — Revisions to controlled documents should be reviewed and approved by the same organizations that reviewed and approved the original issue, unless delegated to another qualified organization.
  - — Inclusion of revision/change information should be made part of the document by one of the following methods:
    - Inclusion of a revision/change record as part of the transmittal package.
    - Inclusion of a revision/change log as part of the document
  - — The revision/change information should include the reason for the revision and identify the page(s) revised.

- Document Review. Organizations originating controlled documents should procedurally define the required review and approval cycles. Resolution of review comments, for which resolution is considered mandatory by the responsible organization prior to approval, should be documented.
- Document Release
  - Organizations originating controlled documents are responsible for ensuring controlled documents are legible, reproducible, adequately reviewed and appropriately approved prior to release for distribution. An effective date for the controlled document should be indicated on the first page of the controlled document, and should allow sufficient time for the development/revision of implementing procedures and training as appropriate.
  - When the revised document is maintained, as in a manual, an updated table of contents or an index should be prepared that accompanies the revision forwarded to the distributing organization.
- Document Distribution.
  - A unique controlled copy number should be assigned to each controlled document listed on the standard distribution list.
  - A systematic transmittal and receipt acknowledgment process should be used to control distribution and track receipt of controlled documents. Individually addressed transmittals should be used to transmit controlled copies of documents to each person on the standard distribution list. The transmittal record should also contain any necessary instructions, including the deadline for return of the signed transmittal receipt and disposition instructions for superseded documents/pages.
  - The recipient of each controlled copy should sign and return the transmittal form to the distributing organization by the due date specified and maintain their controlled copy current.
- Standard Distribution List. Standard distribution lists should be developed for controlled documents and maintained by the organization distributing controlled documents. Additions to or deletions from standard distribution lists should be authorized by the organization originating the documents. Controlled distribution should be limited to avoid the creation of a cumbersome or unmanageable document control system that may ultimately prove self-defeating.
- Document Use. The document user is responsible for ensuring that only the current revision of controlled documents is used in the conduct of project activities. Currency shall be readily verifiable by contacting the distributing organization or referencing the controlled document list.

- Document Assessment. At least annually, each distributing organization should require each copyholder of controlled documents to inventory and verify currency of all controlled copies assigned to that particular copyholder. Random assessments of controlled copies should be made on an as-neededbasis by the distributing organizations, to confirm the adequacy of the controlled distribution process.
- Maintenance of Controlled Copies. As appropriate, controlled copies of project documents should be maintained by the responsible project organization.
    - Master Copy. A master copy is the copy maintained by the distributing organizations for reproduction, distribution and reference of the current revision. The master copy should not be checked out of the distributing organization's files, and access control to the files should be maintained. Only the current or latest revision should be considered a master copy. Historical, superseded, or obsolete revisions should be retained in the appropriate records systems.
    - Controlled Copies. Recipients of each controlled copy should maintain the controlled copy current, promptly inform the distributing organization of any changes in physical relocation, position responsibilities, or titles, and, at least annually, assess the accuracy of their controlled copy(ies).

7.0 PROJECT COMMUNICATIONS MANAGEMENT

7.1 Information Distribution

Information distribution involves making needed information available to project participants in a timely manner. It includes implementing the communications management plan (see the Practice on Communications and Stakeholder Participation) as well as responding to unexpected requests for information.

7.1.1 Inputs to Information distribution:

- Work Results
    - Communications Management Plan
    - Project Execution Plan
    - Tools and Techniques for Information Distribution
- Communication Skills. Communications skills are used to exchange information. The sender is responsible for making the information clearand complete, so that the receiver can receive it correctly and confirm that it is properly understood. The receiver is responsible for ensuring the information is received in its entirety and understood correctly. Communicating has many dimensions:
    - Written and oral

- Internal (within the project) and external (to the customer, the media, the public, etc.)
- Formal (reports, briefings, etc.) and informal (memos, ad hoc conversations, etc.)
- Vertical (up and down the organization) and horizontal (with peers).

- Information Retrieval Systems. Information can be shared by team members through a variety of methods, including manual filing systems, electronic text databases, project management software, and systems that allow access to technical documentation, such as engineering drawings.
- Information Distribution Systems. Project information may be distributed using a variety of methods, including project meetings, hard copy document distribution, shared access to networked electronic databases, fax, electronic mail, voice mail, and video conferencing.

7.1.2 Outputs from Information Distribution

Project records may include correspondence, memos, reports and documents describing the project. This information should, to the extent possible and appropriate, be maintained in an organized fashion. Project Team members may often maintain personal records in a project notebook.

7.2 Performance Reporting

Performance reporting involves collecting and disseminating project performance information to provide stakeholders with information about how resources are being used to achieve project objectives. This process includes

- Status reporting—describing the present status of the project
- Progress reporting—describing what the project has accomplished
- Forecasting—predicting future project status and progress.

Performance reporting should generally provide information on scope, schedule, cost, safety, and quality. Many projects also require information on risk procurement and construction. Reports may be prepared comprehensively or on an exception basis.

7.2.1 Inputs to Performance Reporting

- *Project Execution Plan*. The PEP contains the various baselines used to assess project performance, and the processes that will be used to manage and control the project.
- *Work Results.* Outputs of project execution which include deliverables that have been fully or partially completed, what costs have been incurred or committed, etc. Work results should be reported within the framework provided by the communications

management plan. Accurate, uniform information on work results is essential to useful performance reporting.

- *Other Project Records*. In addition to the PEP and the project's work results, other project documents often contain information pertaining to the project context that should be considered when assessing project performance.

7.2.2 Tools and Techniques for Performance Reporting

- *Performance Reviews*. Performance reviews are meetings held to assess project status or progress. Performance reviews are typically used in conjunction with one or more of the performance reporting techniques described below:
- *Variance Analysis.* Variance analysis involves comparing actual project results to planned or expected results. Schedule and cost variances are the most frequently analyzed, but variances from the plan in the areas of scope, quality and risk are often of equal or greater importance.
- *Trend Analysis.* Trend analysis involves examining project results over time to determine if performance is improving or deteriorating, and for projecting future performance.
- *Earned Value Analysis.* Earned value analysis in its various forms is the most commonly used method of performance measurement. It integrates scope, cost, and schedule measures to help the project management team assess project performance.

7.2.3 Outputs from Performance Reporting

- *Performance Reports.* Performance reports organize and summarize the information gathered and present the results of any analysis. Reports should provide the kinds of information and the level of detail required by various stakeholders as documented in the communications management plan.

  Common formats for performance reports include bar charts (also called Gantt charts), histograms, S-curves, and tables.
- *Change Requests.* Analysis of project performance often generates a request for a change to some aspect of the project. Change requests are handled as described in the various change control processes (e.g., scope change management, schedule control, etc.). Change requests often provide insight into the validity of the project's baselines.

7.3 Administrative Closure

The project or phase, after achieving its objectives or being terminated for other reasons, requires closure. Administrative closure (see the Practice on Closeout) consists of verifying and documenting project results to formalize acceptance of the product or the project by the sponsor, client, or user. It includes the collection of project records that reflect the final

project configuration, an analysis of project success, and effectively archiving such information for future use.

Administrative closure activities should not be delayed until project completion. Each phase of the project should be properly closed upon completion to ensure important and useful information is not lost.

7.3.1 Inputs to Administrative Closure

- *Performance Measurement Documentation*. All documentation produced to record and analyze project performance, including the planning documents that established the framework for performance measurement, should be available during administrative closure.
- *Documentation of the Product or the Project*. Documents produced to describe the product of the project products (plans, specifications, technical documentation, drawings, electronic files etc.—the terminology varies by application area) should be available during administrative closure.
- *Other Project Records*. All other appropriate project records that aid understanding project initiation, performance, scope, schedule, and cost should also be available during administrative closure.

7.3.2 Tools and Techniques for Administrative Closure:

- *Project Archives*. A complete set of indexed project records should be prepared for archiving by the appropriate parties. Any project-specific or program-wide historical databases pertinent to the project should be updated. When projects are under contract or involve significant procurement, archiving financial records should receive speical attention.
- *Formal Acceptance*. Documentation demonstrating the client or sponsor has accepted the project's products (or phase) and appropriate documents acknowledging acceptance be prepared, approved, and distributed.
- *Lessons Learned*. A lessons learned document should be prepared and issued at project completion. The most effective and efficient approach to this requirement is the preparation and issuance of a routine (weekly) lessons learned report throughout the life of a project.